

High levels of individual and feed forward learning foster employee-driven entrepreneurship and innovativeness

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HIGH LEVELS OF INDIVIDUAL AND FEED FORWARD LEARNING FOSTER EMPLOYEE-DRIVEN ENTREPRENEURSHIP AND INNOVATIVENESS

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Dr Thomas Lans, PhD, is an assistant professor at Education and Competence Studies, Wageningen University. His research interests include entrepreneurship education and (situated) entrepreneurial learning. From 2012-2015, he is one of the work package leaders in the European LLLight in Europe FP7 research programme, in which the relationships between learning situations (and their interactions), and learning and innovative performance in the food industry are studied. Furthermore, he coordinates the master track entrepreneurship and is actively involved in entrepreneurship awareness and acceleration programmes.

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Introduction

Why entrepreneurial employee activity and innovation?

Nowadays, innovation and entrepreneurship are important for economic change and crucial for long-term survival of firms. As Christopher Freeman wrote in his study on economics of innovation: “... not to innovate is to die.” According to the Global Entrepreneurship Monitor (GEM) 7.8% of the adults (18-64 years old) in Europe was in 2014 involved in the process of starting or already running a new businesses (Amóres & Bosma, 2014). Moreover, the importance of pursuing opportunities within existing organizations has also increased as a means to realize innovations (among other outcomes). In this context, the GEM has introduced Entrepreneurial Employee Activity (EEA) defined as „employees developing new activities for their main employer, such as developing or launching new goods or services, or setting up a new business unit, a new establishment or subsidiary” (Bosma, Wennekers, Guerrero, Amorós, Martiarena, & Singer, 2013, p. 7). As the GEM results show, 19 of 24 countries of the European Union can be classified as innovation-driven economies, another 4 are in a state of transition towards becoming innovation-driven. EEA is expected most of employees in innovation-driven economies (Amóres & Bosma, 2014). However, the GEM results show that only 7.2% of the employees from innovation-driven economies are actively involved in innovation-related activities (Bosma et al., 2013).

In short, despite the fact that EEA is considered to be important for companies, the number of employees that are involved in innovation is rather low. Therefore, more insight into the innovation process and how innovative behaviour can be stimulated, is needed.

What is innovation?

Innovations are about newness, for instance new products, new methods of production, new sources of supply, the exploitation of new markets, or new ways or organization. Innovation is not only about a new idea, but also about successfully applying and exploiting it.

Following the OECD (2005, p. 46), innovation is therefore, “the implementation of a new or significantly improved product, or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations”.

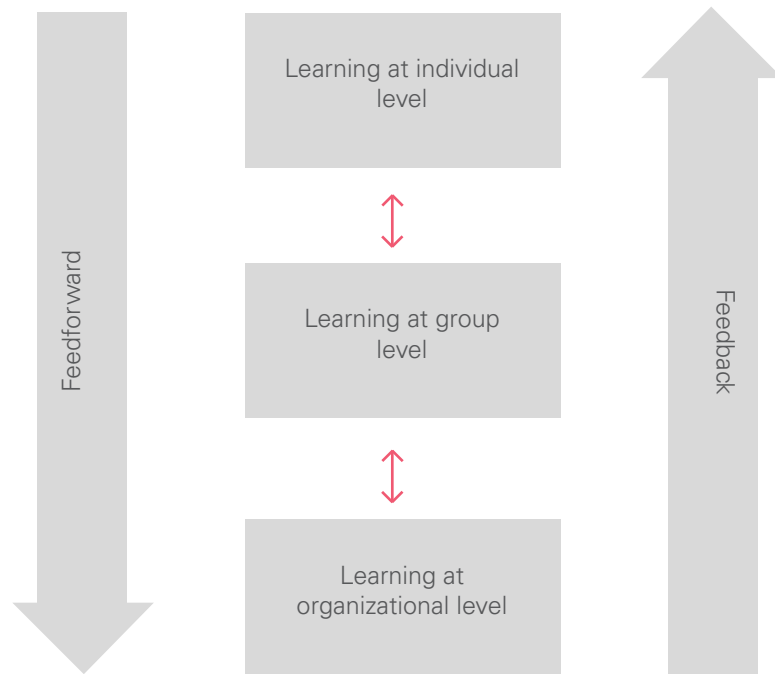
The role of learning in innovation

A key process for innovation is learning (Wang, 2008). Firms enhance their capacity to innovate by stimulating EEA through learning. Innovation can only be realized if firms develop effective knowledge of resources, competencies, and capabilities (Sanchez De Pablo Gonzalez Del Campo & Skerlavaj, 2011). Therefore, the specific focus of this policy brief will be on the relationships between EEA and organizational learning.

Organizational learning

Organizational learning in this project is described based on the model developed by Dutta and Crossan (2005; see Figure 1). According to Dutta and Crossan (2005), learning occurs at different levels in an organization. Learning is approached as an ongoing process of learning new things and making use of what has been learned before. What is learned (the learning content) is referred to as learning stocks, and is situated at the individual, group, and organizational level. The learning stocks are in the model combined with learning flows: the learning processes that influence and create learning stocks at the individual, group, and organizational level. Learning flows involve learning processes moving from the individual level, via the group level to the organizational level (feed forward) and back (feedback).

Figure 1: Model of organizational learning with learning stocks and learning flows (adapted from Dutta & Crossan, 2005)



Preview – research parameters

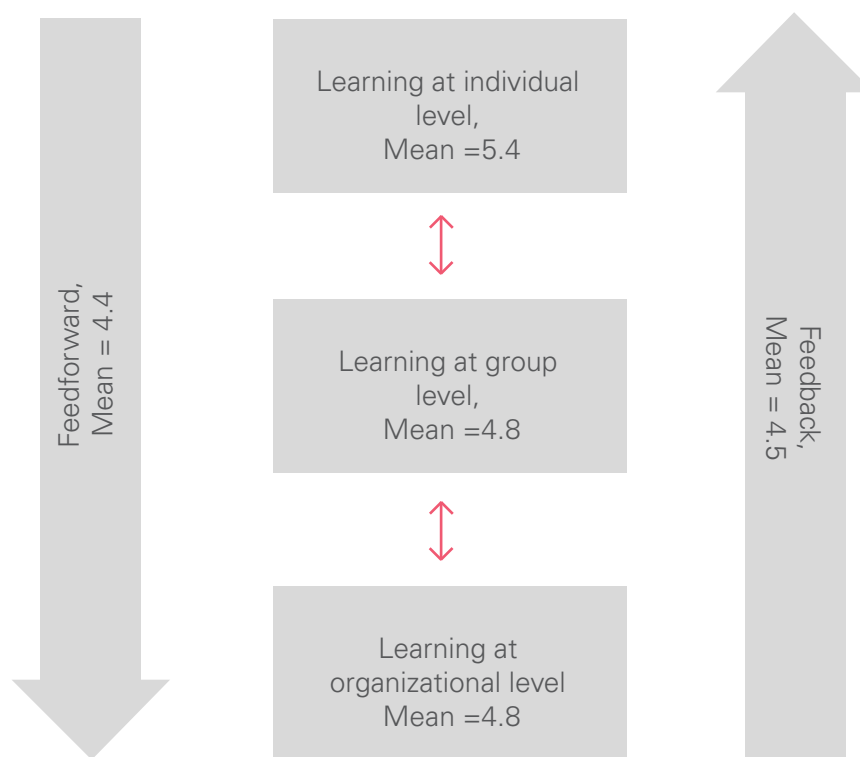
In sum, 234 respondents from 12 different companies from the agriculture, food, and fibre industry in Europe participated in the research conducted at Wageningen University in the context of the FP7 project LLLight'in'Europe. The participants worked on tasks, individually and in groups, related to opportunity identification and evaluation and, thus, to innovation. Also, they completed a questionnaire, that mainly consisted of questions related to learning in their organizations. Please read the 'Research parameters' for more information on the collected data.

Key Observations

Organizational learning

For each level (i.e. individual, group, organization, feedforward, and feedback) the participants answered several questions in the questionnaire on a 7-points scale (ranging from 1 "I strongly agree" to 7 "I strongly disagree"). Figure 2 shows the learning capacity of the organizations from our sample, as perceived by the participants.

Figure 2: Model of organizational learning, adapted from Dutta and Crossan (2005)



The participants scored significantly higher on individual learning, compared to group and organizational learning stocks. The results for the two learning flows are not significantly different. Still, based on the mean scores, realizing feedforward and feedback learning processes seems to be most challenging for the organizations from our sample. Below, the results for the learning stocks will be discussed first. Thereafter, an elaboration on the learning flows will follow.

Learning stocks – individual learning

The individual learning level encompasses individual knowledge and competencies (Bontis, et al., 2002, p. 437). The following items and results illustrate learning on the individual level (7-points scale):

- I feel a sense of accomplishment in what I do; mean = 5.6.
- I generate many new insights; mean = 5.0.
- I have a high level of energy at work; mean = 5.8.
- I am able to break out of traditional mind-sets to see things in new and different ways; mean = 5.4.

The results indicate that generating new insights is experienced as relatively difficult by the employees from our sample.

Earlier empirical research, as conducted by Holman and colleagues (2012), shows that two specific characteristics of job design are important antecedents of learning and employee-driven entrepreneurship on the individual level:

1. Job control: the extent to which employees have the freedom to do their job as they would prefer to do.
2. Problem demand: the frequency and difficulty of task problems; for example, if the employee has to deal with problems which are difficult to solve in his/her daily work.

In our study, outcomes of EEA and innovation were operationalized as 'the number of new ideas that have been adopted by the management over the last three years' by a particular employee. Our results indicate that employees who introduce 3 or more ideas, more often face complex problems in their daily work that take at least 30 minutes to find a good solution than the group that introduces a low number of ideas (i.e. problem demand).

If an employee introduces 6 ideas or more, we also find a relation with the instructions the employees receive regarding the process according to which daily tasks should be performed (i.e. job control).

Learning stocks – group learning

Group level learning is defined as the development of shared understanding or a collective mind (Bontis, et al., 2002). In general, learning on the group level is a prerequisite for innovation: to go beyond what is formally required of team members, to transform new knowledge into daily routines and to enhance a team's capabilities (Lantz & Brav, 2007; Yeh & Chou, 2007). The following items and results illustrate learning on the group level (7-points scale):

- In meetings, we seek to understand everyone's point of view; mean = 5.3.
- We share our successes within the group; mean = 5.0.
- In groups, we have the right people involved in addressing the issues; mean = 4.6.
- Different points of view are encouraged in our group work; mean = 4.6.

Compared to the mean scores of learning on the individual level, the mean scores of learning on the group level are significantly lower. This might indicate that, in general, employees experience that learning on the group level is supported less than learning on the individual level.

Learning stocks - organizational learning

Organizational level learning encompasses the non-human aspects of the organization, such as systems, structures, procedure and strategy (i.e. the organizational memory) (Bontis, et al., 2002). After the group has developed a shared understanding of a new idea, the challenge is to integrate that idea in the organization. This can result in new products, services, processes, procedures, structures, and strategy (Crossan et al., 1999).

In the literature, it is emphasized that organizational learning is more than the sum of the learning of individuals and that organizations differ in their capacity to interpret, remember, and use their learning (Azadegan, Dooley, Carter, & Carter, 2008).

The following items illustrate learning on the group level (7-points scale):

- We have a strategy that positions us well for the future; mean = 4.9.
- The organizational structure supports our strategic direction; mean = 4.8.
- The organizational culture could be characterized as innovative; mean = 4.5.
- We have a realistic yet challenging vision for the future; mean = 4.9.

We have an organizational culture characterized by a high degree of trust; mean = 4.9.

The average scores for organizational learning are comparable with the results for learning on the group level.

In sum, the results for the learning stocks (i.e. individual, group, and organizational level learning), all score above average with regard to the (7-point) scale. This might indicate that employees are, overall, considerably satisfied with learning on the different levels.

Learning flows – feedforward

Feed forward is 'whether and how individual learning feeds forward into group learning and learning at the organizational level (e.g. changes to structure, systems, products, strategy, procedures, culture)' (Bontis et al., 2002, p. 445). The following items are examples of how feedforward learning was operationalized (7-points scale):

- I have input into the organization's strategy; mean = 4.3.
- Teams or groups that I am working in propose innovative solutions to organization-wide issues; mean = 4.4.
- Recommendations by our groups are adopted by the organization; mean = 4.5.
- The company utilizes the intelligence of its workforce; mean = 4.6.
- The "left hand" of the organization knows what the "right hand" is doing; mean = 4.0.
- Results of teams or groups that I am working in are used to improve products, services and processes; mean = 4.9.

The results show that especially communication between the "left hand" and the "right hand" (i.e., communication between different functions and departments) is hard for companies to realize.

Example feedforward learning: Schut Papier?

One of the participating companies from the fibre industry, Schut Papier, scored significantly higher on feed forward learning compared with the other companies. Schut Papier is a relatively small paper mill (40 employees) from the Netherlands. About 80% of the employees working at Schut Papier followed lower vocational education.

At Schut Papier, the employees score significantly higher on the degrees in which they show innovative behaviour (self-perceived) than the other organizations from our sample (mean = 3.7 on a 5-points scale). Also, they have to deal with the introduction of new equipment and reorganizations relatively often (mean = 3.4).

Furthermore, the results show that the employees from Schut Papier actively search for new opportunities in their social networks, that collecting and searching for information is part of their job, and that their job is characterized by a sequence of tasks in which they are frequently interrupted in a significantly higher degree than at most of the other organizations.



An interview with the director was organized to gain more qualitative insight into how innovation and learning are organized at Schut Papier.



Since Schut Papier is a rather small paper mill, the director (see: pictures) decided to focus on monopolistic niche products.



Schut Papier thinks along with clients: clients need them, and they need the clients with unique, specific desires. During the interview, we elaborated upon the process behind innovations. Roughly, the innovation process consists of 3 different steps:

1. Innovation starts with ideas. At Schut Papier, social networks play a key role in coming up with new business ideas. The director invested in building up a network, promoting the paper mill, and characterizing the mill as an innovative one in the market. Not only he, but also colleagues (from marketing and sales) look outside for new business opportunities. Moreover, because of the wide network, people with ideas now increasingly approach Schut Papier. The director explains that he responds to every person that contacts him: each idea has potential, or could get potential in the future. Furthermore, searching on Google, writing down interesting thoughts and ideas, and talking to all kind of people helps to identify business ideas.
2. In his room, the director has three boxes:
 - a. "Ideas to think about"
 - b. "Ideas that need a decision"
 - c. "Developments in 2015"

Together with colleagues with several specialties (e.g. technique, marketing, sales), the ideas are being discussed. The ideas that they do not agree about, are the ones that are further investigated. For the other ideas, it is clear from the brainstorm what to do with them.

- 3 The selected ideas are further explored and tested in the paper mill. Each week, 5 to 10 hours are scheduled to perform trials. Each trial is prepared with great care and afterwards directly evaluated. During the evaluation, it is decided whether a trial will be repeated, or that it has to be rejected after all. After several successful trials, scaling-up takes place and a new innovation is born.

Next, we elaborated upon what factors might contribute to the innovative capacity of Schut Papier. The following factors were identified:

- First of all, social networks: as explained at the first step, contacts are needed to come up with new business ideas.
- An advantage of being small is that the organization is considerably flexible. The organization is flat, three people are in charge of daily work (including the director). As a consequence, the employees can work as one big team.
- Every day, a short meeting is organized to look back at the last 24 hours and look forward to the coming day. Furthermore, the director visits the paper mill on a daily basis and makes a chat with his employees: he asks how they are, how things are going, and for their opinion.
- Guts and passion were mentioned repeatedly by the director as being crucial elements for how he works, and what he expects from his employees. He wants his employees to enjoy their work, and to show passion for what they do.
- The director himself is described as visionary and inspiring by his colleagues. He is very clear, strict, and open towards his employees.
- The director stimulates autonomy and responsibility among employees.

Some employees tend to rely on others when they have to do something new or make decisions, but the director increasingly stimulates employees to act in a responsible and autonomous way. Because the paper mill is growing, two new employees have recently been assigned to fulfil a supervisory role over the employees working at the floor. The processes in the mill could be further optimized, and the new employees will train their colleagues, help them to deal with new situations (e.g. during the trials), and share knowledge, so that the employees will be further enabled to work autonomously.

- Employees get as much freedom to learn as possible. For instance, a new employee has to learn how to colour paper (which is difficult to do). An experienced employee is able to colour the paper correctly within half an hour. The new employee needs 4 hours to create the right colour. However, the director still gives him the space to learn and experiment.
- Employees are allowed to make mistakes and to experiment in their work. Of course, not without limitations: risk-taking, and especially failure, can cost a lot of money. However, making mistakes with the goal in mind to gain progress in the future, is being encouraged.
- When selecting new employees, the learning attitude of the applicant is at least as important as the knowledge he/she has. As the director mentioned: "the right people need to be at the right spot". The director defined learning attitude as someone who is "interactive, proactive, searching for solutions, and passionate".

Although these factors are closely related to the context of Schut Papier, small and medium-sized companies might learn from how innovation and learning are stimulated at Schut Papier. The close collaboration and contact among colleagues are typical for Schut Papier and seem to contribute to the considerably high scores for feedforward learning.

Learning flows - feedback

Feedback learning is defined as 'Whether and how the learning that is embedded in the organization (e.g. systems, structure, strategy) affects individual and group learning' (Bontis et al., 2002, p. 445).

The following items are examples of how feedback learning was operationalized:

- Policies and procedures aid my work; mean = 4.7.
- I always support group decisions; mean = 4.3.
- Company goals are communicated throughout the organization; mean = 4.4.
- Company files and databases provide the necessary information to do our work; mean = 4.9.
- Training is readily available for me when I need to improve my knowledge and skills; mean = 5.0.
- Cross-training, job rotation and special assignments are used in my organization as a strategy to develop a more flexible workforce; mean = 3.8.

As the results indicate, more informal ways of learning are rarely applied in companies (i.e. cross-training, job rotation, and special assignments) in comparison to formal ways of learning (e.g. training).

Example feedback learning: De Groot en Slot

On feedback learning processes, De Groot en Slot scored higher than the other companies. De Groot en Slot is known for their world-wide expertise in propagating material for onions. In sum, 62 (i.e. 50 fte) employees work for this family business (60% of university level). Idea generation and innovation are highly important for De Groot en Slot. Therefore, a certain creative atmosphere is needed and employees have to be fostered to come up with new business ideas. Based on an interview with one of the (two) directors, the following factors seem to contribute to the learning capacity and innovativeness of De Groot en Slot:



1. Organizational structure: De Groot en Slot is a flat organization: next to the directors (consisting of 2 persons) and the management team (MT) (additional 5 persons), there are no formal layers. The employees mainly work in teams. Because of the flat structure and the teamwork, employees experience high levels of responsibility. Also, the communication lines are short: all employees are in close contact with each other. Arundel, Lorenz, Lundvall and Valeyre (2007) confirm in their article that a flat, organic structure fosters innovativeness.
2. Autonomy: the importance of high levels of autonomy among employees is not only fostered by the organizational structure, but also a clear message from the directors. For instance, the director mentioned that employees sometimes ask him what he would do in a certain situation. As the director explains: "I am willing to give my opinion, but I prefer to respond to a proposal of them [employees], because they are responsible. However, a short brainstorm is never a problem". The employees are not judged based on the number of hours they work, but based on results. In sum, employees receive high levels of responsibility and freedom, and the organization expects them to be able to deal with this.
3. Selection: when recruiting new personnel, the organization always aims to find team players. In their first two weeks, new employees get the opportunity to get to know the organization (i.e. in big lines: strategy, mission, vision, etc.) and (direct) colleagues. Thereafter, a programme follows based on the function of the employee.

4. Opportunities for promotion: offering employees the possibility to grow or get promoted in their work, is difficult for some functions (e.g. support). With this in mind, it is striking that only 1 employee left the firm in the year before (because of retirement). As an explanation, the director refers to the great team spirit among his employees and the high levels of responsibility they receive. Besides, some employees do have the opportunity to get promoted. Breeders, for instance, can vary in their work by focussing on changing areas (i.e. Africa, America, etc.).
5. Physical environment: De Groot en Slot recently moved into a new building. The building is different from other (agricultural) buildings, and special attention has been paid to the following (see the pictures below):
 - a. Transparency: the design is open, all doors (including those of the directors' room) are transparent.
 - b. Colour: it is striking that the logo and building have a deep, purple colour.
 - c. Workplace: group of desks are close to each other, the environment feels comfortable, with many plants.





6. Formal learning: Each and every employee is allowed to follow a training or course if he or she would like to do so. Almost 50% of the employees followed a course or training in the year before (on top of the 80% of employees who had to follow obligatory trainings). During the yearly performance interview, it is a standard topic on the agenda. The employees are aware of the fact that they can always follow a training or course, and that they have to be able to argue how the training will help them in their work. To stimulate employees to use their newly gained knowledge and skills in their work, the director sometimes asks employees to reflect upon their learning process in a report.
7. Informal learning: Next to these formal educational activities, several activities are organized to foster informal learning:
 - a. Once a year, the complete team visits a comparable company (with a different core product) to learn from how they organize their work. At the end of the day, the team goes out for a joint diner, in order to promote team building informally.

- b. If deemed relevant, employees are invited to join journeys in order to learn and see the activities the company is involved in. The employee always has to formulate learning goals, and to write a travel report to reflect upon what he/she learned during the journey.
- c. The employees that support the breeders from the office, are invited to join the breeders in the field. By accompanying each other, the breeders and support are able to align their activities as good as possible.
- d. Every morning, all present employees attend a joint coffee break. Employees of all kind of roles, functions, and departments get in contact with each other. On Monday mornings, news is being shared and discussed.

The flat structure, high levels of autonomy among employees, the inviting physical environment, and the stimulation of formal and informal learning, all seem to contribute to the high levels of feedback learning within De Groot en Slot. In addition, work processes are evaluated systematically: based on a visualisation of the complete process, each step in the process is being evaluated.

Recommendations for policy-makers

Overall

Overarching recommendations

- The following organizational aspects are key when it comes to learning and Entrepreneurial Employee Activity (EEA):
 - Job control,
 - problem demand,
 - team work,
 - interaction within and outside teams,
 - risk-taking,
 - experimenting,
 - challenging and complex jobs,
 - autonomy,
 - social networks,
 - passion & guts,
 - low hierarchy,
 - learning attitude,
 - formal learning & informal learning.
- Policy makers should be aware of how work should be designed in the future to challenge employees to learn and innovate, and to create challenging jobs that require a certain job complexity, so that they can facilitate organizations in achieving this. Furthermore, organizations should facilitate the learning, formally and informally, of their employees. However, as the examples show, a “one-size-fits-all” approach does not exist. Every organization has a different structure, and all people have different learning preferences. These should be taken into account when it comes to fostering EEA among employees within a specific company.

Learning stocks

Learning on the individual level

- Earlier research shows that the work characteristics job control and problem demand are important in the context of learning and innovation on the individual level.

- The results from our sample confirm that those employees who experience high levels of job control and problem demand, are more involved in activities related to innovation.
- Therefore, to foster innovativeness, policy could promote job complexity.

Learning on the group level

- The results for learning on the group level are significantly lower than the results for learning on the individual level. Nevertheless, team work is highly important for the interpretation and further developments of ideas. Therefore, group formation, interaction within and outside groups, and teamwork should be supported and facilitated.

Learning on the organizational level

- Employees generally do not experience the companies' culture as innovative. Creating and stimulating an innovative culture (in which experimenting is facilitated) seems therefore needed. Besides, as the examples indicate, a low hierarchy helps to learn and innovate, just as facilitating formal and informal learning activities.

Learning flows

Feedforward learning

- Although feedforward learning is important in the context of innovation, the companies all score relatively low on feedforward learning processes (except for Schut Papier).
- The search and collection of new information contributes to feedforward learning.
- Mainly employees that have to keep an eye on different work processes at the same time, and that are interrupted frequently, seem to score higher on feedforward learning. These results suggest that the more challenging and complex jobs contribute to a higher degree of feedforward learning, and thereby to innovation performance.

- Based on the example of Schut Papier, especially close collaboration and contact seem to contribute to high levels of feedforward learning. The scores on the items of feedforward learning show that especially communication is a difficult challenge. Furthermore, the following employee characteristics are emphasized:
 - a. Learning attitude of employees
 - b. The importance of social networks to come up with new ideas
 - c. Giving employees responsibility and freedom to learn and experiment

From a political point of view, these elements could be acknowledged and policy could be focussed on facilitating companies to create an atmosphere in which learning and innovation are stimulated.

Feedback learning

- More attention is needed for learning activities such as cross-training, job rotation and special assignments, since these kind of activities contribute to feedback learning and are rarely being initiated at this moment.
- A flat structure, autonomy, formal and informal learning contribute to feedback learning and innovativeness. Although it is acknowledged that a "one-size-fits-all" does not exist, these are concrete examples of how feedback learning and innovation can be fostered.

Research parameters

Data is collected based on an innovation and learning assessment. The assessment consists of several individual and group tasks, in which employees were asked to generate business ideas, to evaluate business ideas for their potential to become a successful start-up, and to develop a business case based on the Business Model Canvas (Osterwalder & Pigneur, 2010) (individually and in a group). In sum:

- 12 companies participated from the agricultural, food and fibre sector; from holland and Germany
- Total of 234 participants
- They worked in 53 groups

Next to working on the assignments, the employees filled in a questionnaire which encompassed questions related to work design in general and to learning on the individual, group and organizational level.

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Project Identity

LLLight'in'Europe is an FP7 research project supported by the European Union, which has investigated the relevance and impact of lifelong learning and 21st century skills on innovation, productivity and employability. Against the background of increasingly complex tasks and jobs, understanding which skills impact individuals and organizations, and how such skills can be supported, has important policy implications. LLLight'in'Europe pioneered the use of an instrument to test complex problem solving skills of adults in their work environment. This allowed for the first time insights into the development of professional and learning paths of employed individuals and entrepreneurs and the role that problem solving skills play. Additionally, LLLight'in'Europe draws on a series of databases on adult competences from across the world to conduct rich analyses of skills and their impact.

These analyses were conducted in concert with different disciplines. Economists have been analyzing the impact of cognitive skills on wages and growth; sociologists have been investigating how public policies can support the development of such skills and lifelong learning; innovation researchers have been tracking the relationships between problem solving skills, lifelong learning and entrepreneurship at the organizational level; educational scientists have investigated how successful enterprises support their workforce's competences; cognitive psychologists have researched on the development and implications of cognitive skills relevant for modern occupations and tasks; and an analysis from the perspective of business ethics has clarified the role and scope of employers' responsibility in fostering skills acquisition in their workforce. The team has carried out its research and analyses on the value of skills and lifelong learning in EU countries, USA, China, Latin America and Africa.

The result is a multi-disciplinary analysis of the process of adult learning and problem solving in its different nuances, and of the levers which can support the development of these skills for both those who are already in jobs, and for those who are (re)entering the labor market, as well as the development of effective HR strategies and public policy schemes to support them.

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This policy brief is part of the publication suite of the FP7 Project LLLight'in'Europe. The publication suite consists of 21 policy briefs, 6 thematic reports and 1 synthesis report. The 21 policy briefs discuss findings and policy implications proceeding from the project's research; they are organized along three level of analyses (persons; enterprise; country) and seven topics.

01	Resources of society for learning
02	Institutions of learning
03	Circumstances of learning
04	Role of transversal skills
05	Role of job-specific skills
06	Productivity of skills
07	Outcomes of skills

This policy brief discusses findings related to **Outcomes of skills** at the analysis level **enterprise**. For further publications and multimedia material related to the project, please visit www.lllightineurope.com